UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/526,911	07/25/2005	Richard P. Anderson	ITP 35	7550

84102 7590 03/24/2010

DUNLAP CODDING, P.C. - CRISTAL
P.O. BOX 16370
OKLAHOMA CITY, OK 73113

EXAMINER	
ZALASKY, KATHERINE M	

ART UNIT	PAPER NUMBER
1797	

MAIL DATE	DELIVERY MODE
03/24/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/526,911	ANDERSON ET AL.	
	Examiner	Art Unit	
	KATHERINE ZALASKY	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 January 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,13-16,18-25 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11, 13-16, 18-25 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-11, 13-16, 18-25 and 27, as amended 5 January 2010, are currently pending. **Claims 12, 17 and 26** are cancelled.

Claim Objections

1. **Claim 1** is objected to because of the following informalities: the recitation of "from a slurry of consisting essentially of" in line 2 should be replaced with - - from a slurry consisting essentially of - - for clarity. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. **Claims 1-11, 13-16, 18-25 and 27** are rejected under 35 U.S.C. 103(a) as being unpatentable over Armstrong et al. (US 6,409,797) in view of Bienvenu et al. (US 4,820,339) and When et al. (US 3,880,652) *or, alternatively*, over Armstrong et al. (US 5,779,761) in view of Bienvenu et al. (US 4,820,339) and When et al. (US 3,880,652).

Regarding **claims 1, 18, 19 and 27**, Armstrong et al. '797 discloses a method of separating metal particulates from a slurry consisting essentially of liquid reducing metal, metal particulates, and salt particulates (abstract), the method comprising the steps of:

- filtering the slurry to form a filter cake of metal and salt particulates, wherein the filter cake further includes a residual amount of liquid reducing metal (C4/L24-29, C4/L49-51)
- removing at least a portion of the residual liquid reducing metal from the broken filter cake (C4/L49-51)
- separating the metal and salt particulates (C4/L51-55)

While Armstrong et al. '797 discloses that the filter cake is treated to remove the individual components, the reference does not disclose breaking the filter cake into pieces having average diameters of less than about five centimeters or that this sizing step prior to

washing the metal particulates with water prevents unacceptable explosions of the metal particulates upon contacting the metal particulates with water.

Alternatively, Armstrong et al. '761 discloses all of the same information listed above (abstract, C3/L43-C4/L21) with the exception that the formation of a filter cake is not explicitly stated. However, a filter cake will inherently be formed when the reactant mixture is filtered through a particulate filter (C3/L65-67). Armstrong et al. '761 also fails to disclose that the filter cake is broken into pieces having average diameters of less than about five centimeters or that this sizing step prior to washing the metal particulates with water prevents unacceptable explosions of the metal particulates upon contacting the metal particulates with water.

For the sake of clarity, from this point forward "modified Armstrong" or "Armstrong et al." listed generically refers either to Armstrong '797 or to Armstrong '761. Citations will be given for the individual references where appropriate.

Bienvenu et al. discloses a method of producing metal particulates through a reaction of a reducing metal with a reducible metal and salts (abstract). The reference discloses that once the reaction is complete, the mixture can be directed to a filter, where the solids are collected as a cake which can be further treated, after crushing, with alcohol or water to extract the powdered metal and that the metal can be separated from its salt through vacuum distillation (C4/L31-40).

Wehn et al. discloses a method of treating a reaction product consisting of titanium sponge, unreacted reducing metal and metal salt (C2/L1-5). The reference discloses that the reaction product can be further processed to separate the individual components by either treating the product as is or by first breaking the reaction product up into the form of particles (C2/L5-13, C2/L30-33, C2/L61-66). The latter is more preferable because it has shown to improve the efficiency of the separation of the three components (C2/L14-18, C2/L30-33,

C2/L61-66). Once the reaction product is broken into particles, it can be further treated with an inert gas to separate the components (C2/L19-30); though, the reference also acknowledges that vacuum distillation is a well known and conventional process for the separation of the reaction product also (C1/L40-53).

It would have been obvious to one having ordinary skill in the art at the time of the invention to break the filter cake produced in the method of Armstrong et al. into particle size pieces prior to further treatment of the reaction product, as taught by Bienvenu et al. and Wehn et al., since doing so will help improve the efficiency of further separation steps. Logically, it follows that the efficiency of later separation steps is improved through the increase in surface area available for reaction.

Therefore, while the references teach that the cake should be broken into particle size piece, they do not explicitly disclose that the particles should be less than 5 centimeters or less than 2 centimeters. As the surface area available for reaction, and thus the separation efficiency are variables that can be modified, among others, by adjusting said particle size, with said surface area and separation efficiency both increasing as the particle size is decreased, the precise particle size would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed particle size cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the particle size resulting from the crushing of the filter cake in the method of modified Armstrong to obtain the desired balance between the surface area available for reaction and the separation efficiency (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the

prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 223).

Regarding **claim 2,** modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Armstrong et al. and Bienvenu et al. disclose the method wherein the liquid reducing metal is removed from the broken cake by vacuum distillation (Armstrong '797, C4/L49-51 & Armstrong '761, C3/L43-C4/L21, Bienvenu et al., C4/L31-40).

Regarding **claims 3 and 20**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, while Armstrong et al. discloses the use of vacuum distillation to remove the reducing metal (Armstrong '797, C4/L49-51 & Armstrong '761, C3/L43-C4/L21), Wehn et al. discloses that while vacuum distillation is a well known separation method, an alternate, and more preferable method can be used wherein the liquid reducing metal is removed from the broken cake with a hot sweep gas (C1/L40-53, C2/L19-30). Wehn et al. teaches that vacuum distillation is less preferable because it requires very long heating times at high temperatures which renders the practice uneconomical (C1/L40-53).

It would have been obvious to one having ordinary skill in the art at the time of the invention to use an inert gas to remove the reducing metal from the broken filter cake particles instead of vacuum distillation in the method of modified Armstrong, as taught by Wehn et al., since doing so provides a more efficient and economical separation process.

Regarding **claims 4-7 and 21-23**, modified Armstrong discloses all of the claim limitations as set forth above. Additionally, Wehn et al. discloses the method wherein the hot sweep gas is an inert gas, wherein the inert gas is argon, wherein the hot sweep gas is at positive pressure, and wherein the hot argon sweep gas is at positive pressure (C2/L19-36).

Regarding **claim 8-10 and 24**, modified Armstrong discloses all of the limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the liquid reducing

metal is Na or Mg (Armstrong '797, C4/L49-55 & Armstrong '761 C3/L43-C4/L21). While the reference does not disclose that the liquid reducing metal is present in the filter cake in an amount less than about ten times the weight of the metal particulates, the reference does suggest that titanium and sodium chloride are the primary reaction products, with sodium being present in a residual amount (Armstrong '797, C4/L24-55 & Armstrong '761, C3/L43-C4/L21). Therefore, the filter cake will inherently have sodium present in an amount less than about ten times the weight of the titanium. Additionally, the instant Application explicitly states that the process of the Application follows the Armstrong process and relates to any product produced by the Armstrong process (instant specification, pg 1 "Summary of the Invention"). Therefore, since the Armstrong reference is the process referred to, the filter cake produced in the reference will inherently be the same which is referred to in the claim and will have sodium present in an amount less than about ten times the weight of the titanium.

Regarding **claim 11 and 25**, modified Armstrong discloses all of the limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the metal particulates are Ti or a Ti alloy (Armstrong '797, C4/L49-55 & Armstrong '761, C3/L43-C4/L21).

Regarding **claims 13-16**, modified Armstrong discloses all of the limitations as set forth above. Additionally, Armstrong et al. discloses the method wherein the salt particulates are at least one halide, wherein the at least one halide is a chloride, wherein the metal particulates are Ti or a Ti alloy and the salt is NaCl or $MgCl_2$, wherein the liquid reducing metal is Na and the salt particulates are NaCl (Armstrong '797, C4/L49-55 & Armstrong '761, C3/L43-C4/L21).

Response to Arguments

3. Applicant's arguments with respect to **claims 1-27** have been considered but are moot in view of the new ground(s) of rejection.

4. Additionally, to the extent that the argument is applicable to the new rejection, the Applicant has argued that instant Application presents unexpected results in that breaking the filter cake into pieces having an average diameter less than 5 cm drastically reduces the reaction time and reduces the risk for explosions when water contacts the reducing metal. It has already been established in the prior art the breaking the filter cake can improve reaction efficiency (see above, Wehn et al.). Additionally, it follows logically that when the surface area for reaction in increased, that the time for a reaction to complete will be drastically reduced (i.e. it takes less time for granules of salt to dissolve in water than a brick of salt). Therefore, the result presented by the Applicant hardly seems to be unexpected. If the Applicant has additional evidence to support this claim, they are respectfully requested to submit this evidence along with the next response.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHERINE ZALASKY whose telephone number is (571) 270-7064. The examiner can normally be reached on 7:30am - 6:00pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571)272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KZ/
17 March 2010

/Vickie Kim/
Supervisory Patent Examiner, Art Unit 1797